U.S. Department
of Transportation

Federal Aviation Administration

Advisory Circular

Subject: Change 8 to STANDARDS FOR SPECIFYING CONSTRUCTION OF AIRPORTS

Date: 7/6/94
Initiated by: AAS-200

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Change: 8

1. PURPOSE. Item F-162, Chain Link Fences, has been revised to incorporate new materials.

PAGE CONTROL CHART

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ITEM F-162 CHAIN-LINK FENCES

DESCRIPTION

162-1.1 This item shall consist of furnishing and erecting a chain-link fence in accordance with these specifications and the details shown on the plans and in conformity with the lines and grades shown on the plans or established by the Engineer.

MATERIALS

162-2.1 FABRIC. [The fabric shall be woven with a 9-gauge [galvanized steel wire] [polyvinyl chloride (PVC)-coated steel] [aluminum alloy] [zinc-5% aluminum mischmetal] wire in a 2-inch (50 mm) mesh and shall meet the requirements of [ ].] [The fabric shall be woven from a [ ] gauge aluminum-coated steel wire in a 2-inch (50 mm) mesh and shall conform to the requirements of ASTM A 491.]

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Galvanized steel fabric shall conform to the requirements of ASTM A 392, Class 2.

Polyvinyl chloride-coated steel shall conform to the requirements of ASTM F 668, Class 2b.

Aluminum alloy fabric shall conform to the requirements of ASTM F 1183.

Zinc-5% aluminum mischmetal alloy coated steel shall conform to the requirements of ASTM F 1345, Class 2.

The Engineer shall specify 9 or 10 gauge aluminum-coated wire.

Metallic-coated fabric shall have a clear acrylic coating applied to the selvage area after weaving.

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162-2.2 BARBED WIRE. Barbed wire shall be 2-strand 12-1/2 gauge **[zinc-coated] [aluminum-coated]** wire with 4-point barbs and shall conform to the requirements of [**].**

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Zinc-coated barbed wire shall conform to the requirements of ASTM A 121, Class 3, Chain Link Fence Grade.

Aluminum-coated barbed wire shall conform to the requirements of ASTM A 585, Class II.

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162-2.3 POSTS, RAILS AND BRACES. Posts, rails, and braces furnished for use in conjunction with zinc-coated, zinc-5 % aluminum mischmetal alloy coated, or aluminum-coated steel fabric shall be of zinc-coated steel, zinc/polymer-coated steel, or zinc-5 % aluminum mischmetal alloy coated steel framework. Those furnished for use in conjunction with aluminum alloy fabric shall be aluminum alloy.

Line posts, rails, and braces shall be **[galvanized steel pipe] [zinc/polymer-coated steel pipe] [vinyl-coated steel] [structural shapes] [roll formed] [aluminum alloy]** conforming to the requirements of [**].**

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Galvanized steel pipe shall conform to the requirements of ASTM F 1083.

Zinc/polymer-coated steel pipe shall conform to the requirements of ASTM A 569 or ASTM A 446, Grade D. Exterior coating shall be in accordance with ASTM F 1234, Type B. Interior coating shall be in accordance with ASTM F 1234, Type B or D.

The steel used in all structural shapes shall conform to the requirements of ASTM A 572, Grade 45, and shall be galvanized in accordance with the requirements of ASTM F 1234, Type A.

Roll-formed sections shall be fabricated from material meeting the requirements of ASTM A 570, Grade 45, and shall be galvanized in accordance with the requirements of ASTM F 1234, Type A, or coated with zinc-5% aluminum mischmetal alloy in accordance with ASTM F 1234, Type C.

Aluminum alloy shall conform to the requirements of ASTM B 429, alloy 6063-T6, Schedule 40, for extruded pipe and tube.

Aluminum alloy shall conform to the requirements of ASTM B 221, alloy 6063-T6, for extruded bar, shape, and tube.

Vinyl-coated steel shall conform to the requirements of Fed. Spec. RR-F-191/3.

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Post, rails, and braces shall demonstrate the ability to withstand testing in salt spray in accordance with ASTM B 117 as follows:

Exterior: 1,000 hours with a maximum of 5 % red rust.
Interior: 650 hours with a maximum of 5 % red rust.

The dimensions of the posts, rails, and braces shall be in accordance with Tables I through VI of Fed. Spec. RR-F-191/3.

162-2.4 GATES. Gate frames shall consist of **[galvanized steel pipe] [polymer-coated steel pipe] [aluminum alloy pipe]** and shall conform to the specifications for the same material under paragraph 162-2.3. The fabric shall be of the same type material as used in the fence.

162-2.5 WIRE **TIES** AND **TENSION WIRES.** Wire ties for use in conjunction with a given type of fabric shall be of the same material and coating weight identified with the fabric type. Tension wire shall be 7-gauge marcelled steel wire with the same coating as the fabric type and shall conform to ASTM A 824.

All material shall conform to Fed. Spec. RR-F-191/4.

162-6 MISCELLANEOUS FITTINGS AND HARDWARE. Miscellaneous steel fittings and hardware for use **with [zinc-coated] [aluminum-coated] [zinc-5% aluminum mischmetal alloy-coated]** steel fabric shall be of commercial grade steel or better quality, wrought or cast as appropriate to the article, and sufficient in strength to provide-a balanced design when used in conjunction with fabric posts, and wires of the quality specified herein. **[All steel fittings and hardware shall be protected with a zinc coating applied in conformance with ASTM A 153.] [Miscellaneous aluminum fittings for use with aluminum alloy fabric shall be wrought or cast aluminum**

alloy.] Barbed wire support arms shall withstand a load of 250 pounds (113 kg) applied vertically to the outermost end of the arm.

162-2.7 CONCRETE. Concrete shall be of a commercial grade with a minimum 28-day compressive strength of 2500 psi (17 240 kPa).

162-2.8 MARKING. Each roll of fabric shall carry a tag showing the kind of base metal (steel, aluminum, or aluminum alloy number), kind of coating, the gauge of the wire, the length of fencing in the roll, and the name of the manufacturer. Posts, wire, and other fittings shall be identified as to manufacturer, kind of base metal (steel, aluminum, or aluminum alloy number), and kind of coating.

CONSTRUCTION METHODS

162-3.1 CLEARING FENCE LINE. All trees, brush, stumps, logs, and other debris which would interfere with the proper construction of the fence in the required location shall be removed a minimum width of 2 feet (61 cm) on each side of the fence centerline before starting fencing operations. The cost of removing and disposing of the material shall not constitute a pay item and shall be considered incidental to fence construction.

162-3.2 INSTALLING POSTS. All posts shall be set in concrete at the required dimension and depth and at the spacing shown on the plans.

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Posts should be spaced not more than 10 feet (3 m) apart and should be set a minimum of 36 inches (90 cm) in concrete footings. If the frost depth is greater than 36 inches (90 cm), the posts should be set accordingly. The posts holes shall be in proper alignment so that there is a minimum of 3 inches (75 mm) of concrete on all sides of the posts.

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The concrete shall be thoroughly compacted around the posts by tamping or vibrating and shall have a smooth finish slightly higher than the ground and sloped to drain away from the posts. All posts shall be set plumb and to the required grade and alignment. No materials shall be installed on the posts, nor shall the posts be disturbed in any manner within 7 days after the individual post footing is completed.

Should rock be encountered at a depth less than the planned footing depth, a hole 2 inches (50 mm) larger than the greatest dimension of the posts shall be drilled to a depth of 12 inches (300 mm). After the posts are set, the remainder of the drilled hole shall be filled with grout, composed of one part Portland cement and two parts mortar sand. Any remaining space above the rock shall be filled with concrete in the manner described above.

In lieu of drilling, the rock may be excavated to the required footing depth. No extra compensation shall be made for rock excavation.

162-3.3 INSTALLING TOP RAILS. The top rail shall be continuous and shall pass through the post tops. The coupling used to join the top rail lengths shall allow for expansion.

162-3.4 INSTALLING BRACES. Horizontal brace rails, with diagonal truss rods and turnbuckles, shall be installed at all terminal posts.

162-3.5 INSTALLING FABRIC. The wire fabric shall be firmly attached to the posts and braced in the manner shown on the plans. All wire shall be stretched taut and shall be installed to the required elevations. The fence shall generally follow the contour of the ground, with the bottom of the fence fabric no less than 1 inch (25 mm) or

more than 4 inches (100 mm) from the ground surface. Grading shall be performed where necessary to provide a neat appearance.

At locations of small natural swales or drainage ditches and where it is not practical to have the fence conform to the general contour of the ground surface, longer posts may be used and multiple strands of barbed wire stretched thereon to span the opening below the fence. The vertical clearance between strands of barbed wire shall be 6 inches (150 mm) or less.

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Openings below the fence may also be spanned with barbed wire fastened to stakes.

The Engineer shall specify if tension wire is to be installed.

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162-3.6 ELECTRICAL GROUNDS. Electrical grounds shall be constructed **[where a power line passes over the fence] [at 500-foot (150 m) intervals]. [The ground shall be installed directly below the point of crossing.]** The ground shall be accomplished with a copper clad rod 8 feet (240 cm) long and a minimum of 5/8 inch (15 mm) in diameter driven vertically until the top is 6 inches (150 mm) below the ground surface. A No. 6 solid copper conductor shall be clamped to the rod and to the fence in such a manner that each element of the fence is grounded. Installation of ground rods shall not constitute a pay item and shall be considered incidental to fence construction.

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The Engineer shall indicate the location of all electrical grounds on the plans.

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METHOD OF MEASUREMENT

162-4.1 Chain-link fence will be measured for payment by the linear foot (meter). Measurement will be along the top of the fence from center to center of end posts, excluding the length occupied by gate openings.

Gates will be measured as complete units.

BASIS OF PAYMENT

162-5.1 Payment for chain-link fence will be made at the contract unit price per linear foot (meter).

Payment for driveway or walkway gates will be made at the contract unit price for each gate.

The price shall be full compensation for furnishing all materials, and for all preparation, erection, and installation of these materials, and for all labor equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item F-162-5.1	Chain-Link Fence--per linear foot (meter)

Item F-162-5.2 Driveway Gates--per each

Item F-162-5.3 Walkway Gates--per each

MATERIAL REQUIREMENTS

ASTM A 121 Zinc-Coated (Galvanized) Steel Barbed Wire

ASTM A 123 Zinc (Hot Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip

ASTM A 153 Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A 392 Zinc-Coated Steel Chain-Link Fence Fabric

ASTM A 446 Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality

ASTM A 491 Aluminum-Coated Steel Chain-Link Fence Fabric

ASTM A 569 Steel, Carbon (0.15 Maximum, Percent), Hot Rolled Sheet and Strip Commercial Quality

ASTM A 570 Hot-Rolled Carbon Steel Sheet and Strip Structural Quality

ASTM A 572 High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality

ASTM A 585 Aluminum-Coated Steel Barbed Wire

ASTM A 824 Metallic-Coated Steel Marcelled Tension Wire for Use With Chain Link Fence

ASTM B 117 Standard Test Method of Salt Spray (Fog) Testing

ASTM B 221 Aluminum-Alloy Extruded Bars, Rods, Wire Shapes and Tubes

ASTM F 668 Poly(vinyl Chloride)(PVC)-Coated Steel Chain-Link Fence

ASTM F 1083 Pipe, Steel, Hot-Dipped Zinc-coated (galvanized) Welded, for Fence Structures

ASTM F 1183 Aluminum Alloy Chain Link Fence Fabric

ASTM F 1234 Protective Coatings on Steel Framework for Fences

Fed. Spec. RR-F-191/3 Fencing, Wire and Post, Metal (Chain-Link Fence Posts, Top Rails and Braces)

Fed. Spec. RR-F-191/4 Fencing, Wire and Post, Metal (Chain-Link Fence Accessories)